Creative Destruction and the Bright Side of Economic Downturns[☆]

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Abstract

We find that business cycles drive productive economic churn. During recessions, firms with high previous abnormal investment scale back while firms with low abnormal investment scale up. These findings are consistent with an improvement in the efficiency of new investment over the business cycle. Our estimates suggest that an average firm cuts abnormal investment during recessions by about 14%, or roughly $276M. Valuation ratios converge similarly, with reductions in unexpected investment showing relative value improvement. Our results are stronger for less entrenched firms and firms with more active shareholders, which points to shareholder monitoring as an economic channel. Overall, the efficiency of new investment appears to improve in recessions and decline in expansions, consistent with creative destruction on the intensive margin.

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1. Introduction

Recessions are characterized by a decline in firm investment, rising unemployment, and generally bad economic news. However, economists as far back as Marx (1867), Mitchell (1913), and Schumpeter (1942) suggest that downturns also reflect the "creative destruction" of older and less profitable technologies, sectors, or firms that are shuttered and replaced by new investments and productive growth. While it is nearly folk wisdom that bad investments swell in expansions and get winnowed out in recessions, there is little theoretical or empirical justification for the basic idea in either Keynesian or real business cycle models.

Indeed, the empirical evidence suggests that capital stock productivity is strongly procyclical, as factories operate at the full capacity that they were designed for in expansions and lie fallow in bad times. In this paper, we study the microfoundations of creative destruction on the intensive margin. Consistent with the folk wisdom, we find that firms that are investing more than expected cut new investment by about 17% during bad times. Firms that are investing less than expected increase new investment by about 11%. Further, these effects are more pronounced for firms with higher shareholder activism and stronger corporate control mechanisms. These findings suggest shareholder monitoring is an important channel. We also document improvements in the valuation ratios of the firms that adjust their investment, suggesting the changes are economically beneficial.

The creative destruction that we study is within-firm over time. Rather than focus on whether cycles arise from large-scale technology shocks, we focus on firm-level changes on the intensive margin. Examples include when firms innovate, update production processes, cut costs, refine pricing strategies, and so on. Under the pressure of a downturn, firms may tilt new investment towards new, more productive outlets. Indeed, these micro-level transformations are discussed by Schumpeter (1942) as the "constant dynamics of innovation" that arise from competitive pressure. Changes in the relative costs of capital and labor, the set of investment opportunities, prices of input factors, and product demand are all cyclical and directly affect firm-level investment.

Beyond the typical macro factors that drive aggregate cycles, the theory of corporate finance also predicts deviations from optimal investment based on agency, moral hazard,

and asymmetric information. For example, managers may waste free cash flow on negative NPV projects to build empires or consume perquisites (Jensen, 1986; Blanchard, López-de-Silanes, and Shleifer, 1994). Firms may also overinvest if their managers exhibit behavioral biases like overconfidence or optimism (Malmendier and Tate, 2005, 2008). On the other hand, costly external finance may lead to suboptimal underinvestment through asymmetric information (Myers and Majluf, 1984; Greenwald, Stiglitz, and Weiss, 1984) and moral hazard (Jensen and Meckling, 1976; Grossman and Hart, 1983; Stulz, 1990; Hart and Moore, 1995). Similarly, managers may underinvest because of risk-averse labor market concerns (Fama, 1980; Holmström and Ricart i Costa, 1986; Dewatripont, Jewitt, and Tirole, 1999).

Corporate finance frictions may also change dynamically over the business cycle. Free cash flow is higher in expansions, allowing managers to overinvest (Jensen, 1986). As external financing becomes more costly in downturns, underinvestment among constrained firms rises (Bernstein, Lerner, and Mezzanotti, 2019). In addition, debt overhang problems, which increase as equity values decline, may rise in recessions. Asset fire sales during downturns can further exacerbate debt overhang effects (Shleifer and Vishny, 1992). Executive compensation policy may also drive firms to sacrifice optimal long-run investment policy to maximize short-term incentives within the current part of the business cycle (Bolton, Scheinkman, and Xiong, 2006; Laux, 2012).

The impact of these frictions may change in downturns as predicted by costly state verification models. As far back as Townsend (1979), contract theory suggests that investor monitoring increases with the proximity to default, as costly monitoring is often suboptimal for debt contracts in good standing. This basic idea maps naturally into business cycles. If firms destroy wealth by over- or underinvesting, they are more likely to escape detection when times are good. When state-contingent payments disappear—as they reasonably might in a recession—then the marginal value of monitoring is high and lenders invest in costly state verification. Roughly speaking, suboptimal behavior should be more easy to identify in recessions.[1] Another dynamic Philippon (2006) suggests is that managers need to move

[1]Bernanke and Gertler (1989) use Townsend (1979) to motivate business cycle variation in agency costs. Their focus is on external financing frictions for new capital related to borrower net worth. We focus on the

quickly when times are good and product demand is high; shareholders, therefore, give management more discretion and less scrutiny in good times.

Taking these theoretical underpinnings together yields a fresh set of testable predictions. We test the hypothesis that abnormal investment in new capital declines in a recession and, by contrast, increases in expansions. Our basic empirical strategy is to measure abnormal investment and test for differences over the six economic cycles in our sample from 1972–2017. We find strong evidence of reductions in abnormal investment during recessions. Overinvesting firms cut investment during recessions by about 17%, or roughly $338M on average. In contrast, an average underinvesting firm *increases* investment during recessions by about 11%, or $232M. We also refine our tests in various cross-sectional splits and find evidence consistent with shareholder monitoring as an economic channel. As firms face tough times, external monitoring and control appear to help mitigate both under- and overinvestment problems.

Our measure of abnormal investment is simple and based on Richardson (2006). We first form a regression forecast of investment, using a panel of a firm's past investment, growth opportunities, age, size, and some financial measures such as leverage, cash, and past returns. We define abnormal investment as the residuals from this panel regression because deviations from our prediction suggest that investment is out of line relative to both other firms and past investment. This approach has some advantages and limitations. The main advantage is simplicity, since this measure is abnormal investment relative to an in-sample statistical benchmark. Of course, the disadvantage is that residuals could measure investment that, while statistically abnormal, is perfectly efficient. Further, our fixed-effects model precludes us from measuring time-invariant systematic under- or overinvestment at an industry level. Both of these problems attenuate the precision of our measure. However, we view this as a worthwhile tradeoff since our focus is at the business cycle frequency and we view our measure as a noisy instrument for under- and overinvestment.

In our first set of tests we find that firms cut investment spending in a recession even

effects of increased monitoring on investment policy, which we argue would lessen managerial discretion in downturns.

more than expected if they have large past abnormal investment. Similarly, underinvesting firms increase investment. The changes are economically significant and represent about 20% of the median firm's investment spending. Results are consistent across most of the downturns in our sample. It is important to note that we are not making broad statements about investment efficiency on average. Rather, our focus is on whether firms that appear to be investing more or less than we would predict change their behavior during recessions.

Next, we dig deeper into the cross-sectional variation in our results. To help identify the mechanism that links investment to downturns, we split our sample by some variables that are credibly correlated with corporate governance. Our first measure is whether a firm has a recent shareholder filing of form 13D or 13G, which signals the presence of an activist or other large investor. Our second measure is the entrenchment index of Bebchuk, Cohen, and Ferrell (2009). This measure bundles corporate structures like staggered boards, poison pills, supermajorities, and golden parachutes into an index associated with agency costs. For both measures, we find similar results. Firms with more shareholder activism and less entrenchment react more to recessions and reduce abnormal investment. These differences are economically significant and suggest a monitoring channel.

The changes in investment policy in recessions have a natural implication for valuation. If the prior investment was inefficient, then valuations should rise. To test this, we look at the change in market-to-book ratios around business cycles for firms with abnormally high or low investment levels. While valuations fall in recessions, we find better performance for firms that correct an abnormal investment policy. Specifically, firms that reduce abnormal investment have 4.7% higher market-to-book ratios post-recession than their non-adjusting peers (as a fraction of the median sample market-to-book). While these results are only suggestive, they underscore the notion that changes in the investment behavior of firms with abnormal investment appear to be different and that firm valuations change to reflect differences in investment efficiency.

Our results are robust to a battery of alternative specifications. In addition to National Bureau of Economic Research (NBER) recessions, we also test the effect of sector-specific recessions and find similar results. Our results are also insensitive to the precise timing and

magnitude of our recession thresholds and do not depend on any single downturn. We also test different measures of abnormal investment and results remain qualitatively unchanged. Finally, it is important to note that our results do not reflect simple mean reversion in firm-level investment policy. Since our measures of abnormal investment are regression residuals, there could be some negative autocorrelation that mimics a spurious mean reversion in our tests. We find no such evidence of these statistical properties in our measure. Further, we construct placebo business cycles by simulating recessionary and expansionary periods and find no time-series patterns that resemble our results around actual business cycles. Overall, our results are robust to reasonable changes in our methodology and tests.

Our paper makes several contributions. First, we link firm-level abnormal investment to business cycle variation in investment levels. Second, we map these dynamics into firm-level corporate financing frictions, a microfoundation noticeably missing in most representative firm models of aggregate behavior. Overall, our study attempts to connect macro-finance behavior to the microfoundations of corporate-financing frictions.

Second, our work contributes our understanding of investment under uncertainty. (Guiso and Parigi, 1999; Bloom, 2009; Julio and Yook, 2012; Dangl and Wu, 2016; Gulen and Ion, 2016). While past studies generally document a reduction in firm-level investment during recessionary times, we show that abnormal over- and underinvestment also decreases during bad times. To our knowledge, this is the first study to calibrate the positive effect of economic downturns at the firm level by testing the deviation from expectations, rather than just the level, of new capital investment.

Our study also relates to the corporate governance literature. Prior studies document a positive impact of superior corporate governance on different aspects of firm performance, including firm value, profitability, investment, and stock returns. Our paper documents another positive impact of better corporate governance: investment policy may actually improve during economic hardship due to superior governance.

At the core of our paper is a friction between managers and shareholders that declines in downturns as external monitoring rises. It has a similar dynamic to the manager-shareholder friction modeled by Westermann (2018), except there the cost of the friction over the business

cycle is driven by managerial leverage decisions. Our friction complements the external-financing agency friction considered by Bernanke and Gertler (1989) and Carlstrom and Fuerst (1997), which is exacerbated, rather than mitigated, in downturns.

Finally, our paper provides an interesting contrast to prior work on the reallocation of the capital stock over the business cycle. Eisfeldt and Rampini (2006) and Kehrig (2015) document that capital reallocation is procyclical and their findings are consistent with higher reallocation frictions in recessions. We complement these findings and show that deviations from expected *new* investment is cyclical and is driven in part by improved monitoring.

Our paper proceeds as follows. Section 2 describes the sample selection, construction of different abnormal investment proxies, and summary statistics. Section 3 presents the main results on abnormal investment and economic downturns. Section 4 discusses the potential mechanisms through which recessionary periods could affect investment policy. Section 5 examines the operating performance of firms around business cycles. Section 6 offers a battery of robustness tests, and Section 7 concludes.

2. Data Sources, Variable Construction, and Descriptive Statistics

Our sample includes U.S. firms listed on NYSE, AMEX, or NASDAQ with CRSP share codes of 10 and 11, which are covered by CRSP and Compustat between 1972 and 2017. We exclude firms with missing or negative total assets and exclude utilities (SIC codes 4900–4949) and financials (SIC codes 6000–6999).[2] Recessions are based on the NBER dates. We measure the degree of managerial entrenchment using the E-Index from the ISS RiskMetrics database (Bebchuk, Cohen, and Ferrell, 2009). We collect data on Schedule 13D and 13G filings with the U.S. Securities and Exchange Commission (SEC). Based on SEC regulations, active, beneficiary investors who intend to exert control over the company and who own more than 5% of a voting class of a company's equity are required to file a Schedule 13D with the SEC within 10 days of the transaction. In contrast, passive investors who own more than 5% of a company's outstanding shares without any specific control intent are

[2]Because some companies change their fiscal year end date in the middle of the calendar year, there is more than one annual record for the accounting data in these cases. We select the last annual record in a given calendar year.

required to file a Schedule 13G. The filing and entrenchment data span from 1995 through 2017.

2.1. Variable Construction

2.1.1. Measures of Abnormal Investment

Our primary measure of abnormal investment is based on Richardson (2006) and extended by Stoughton, Wong, and Yi (2017). We first estimate the expected investment level using the following regression:

$$I_{i,j,t} = \beta_1 V/P_{i,j,t-1} + \beta_2 Leverage_{i,j,t-1} + \beta_3 Cash_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Return_{i,j,t-1} + \beta_6 Age_{i,j,t-1} + \beta_7 I_{i,j,t-1} + \theta_j + \lambda_t + \varepsilon_{i,j,t}, \quad (1)$$

for firm i in industry j in year t. The dependent variable, new investment, consists of capital expenditures plus research and development (R&D) expenses plus acquisitions minus sale of property, plant, and equipment (PP&E) minus amortization and depreciation, all scaled by lagged total assets.[3] V/P measures firm growth opportunities, where V represents the value of assets in place divided by the market value of equity, P. The value of assets in place comes from a residual income model of assets described in Ohlson (1995) and Richardson (2006). Our results hold if we use the firm's market-to-book ratio or recent sales growth as the measure of growth opportunities. *Leverage* is the sum of the book value of short-term and long-term debt divided by the sum of the book value of total debt and the book value of equity. *Cash* is the balance of cash and short-term investments scaled by total assets at the start of the year. *Size* is the natural logarithm of total assets. *Return* is the stock return measured as the change in market capitalization of the firm over the previous year, and *Age* is the natural logarithm of one plus the number of years the firm has been listed in the Compustat database. We use the Fama-French 48 industry classification to group firms into industries. We include industry fixed effects, θ_j, to control for unobserved industry differences and year fixed effects, λ_t, to control for any time trends and to remove common macroeconomic shocks from our estimates. All ratio variables are winsorized at the 1% and

[3]We set missing values of sale of PP&E, R&D, and acquisitions to zero.

99% tails. Finally, the reported standard errors are robust to heteroskedasticity and are clustered by firm and year to account for within-firm and within-year serial correlation.

We report the regression estimates for equation (1) in Table 1. The results are largely consistent with prior studies (Richardson, 2006; Stoughton, Wong, and Yi, 2017). Focusing on Column 4, which includes both industry and year fixed effects, the negative coefficient for V/P implies that firms with higher growth opportunities have higher investment. The negative coefficient for *Leverage* and the positive coefficients for *Cash* and *Size* suggest that larger firms with lower financial constraints also have higher investment. The negative coefficient for *Age* implies that firms that are later in their life cycle have lower investment. The results also show that firms with good past stock performance and higher prior investment tend to have higher future investment than their industry peers.

Should equation (1) predict the firm's expected investment level, the estimated residuals from this model may be used to measure unexpected investment. Because the expected value of residuals is zero i.e., $E(\varepsilon_{i,j,t}) = 0$, the absolute values of the residuals represent a deviation from the expected investment level or abnormal investment. Therefore, we classify firms with positive residuals in a given year as overinvesting firms and firms with negative residuals in a given year as underinvesting firms. Mathematically, the abnormal investment proxy (AI), overinvestment proxy (OI), and underinvestment proxy (UI) for firm i in industry j at time t are defined, respectively, as:

$$AI_{i,j,t} = |\widehat{\varepsilon}_{i,j,t}| = |I_{i,j,t} - \widehat{I}_{i,j,t}| \tag{2}$$

$$OI_{i,j,t} = |\widehat{\varepsilon}_{i,j,t}| = |I_{i,j,t} - \widehat{I}_{i,j,t}| \qquad \text{if} \quad I_{i,j,t} > \widehat{I}_{i,j,t} \tag{3}$$

$$UI_{i,j,t} = |\widehat{\varepsilon}_{i,j,t}| = |I_{i,j,t} - \widehat{I}_{i,j,t}| \qquad \text{if} \quad I_{i,j,t} < \widehat{I}_{i,j,t}, \tag{4}$$

where higher values of these proxies, AI, OI, UI, imply a greater degree of abnormal investment (in either direction), overinvestment, or underinvestment, respectively. Several recent studies use a similar approach to measure firm-level expected investment and examine its association with product market competition (Stoughton, Wong, and Yi, 2017), analysts' capital expenditure forecasts (Choi, Hann, Subasi, and Zheng, 2020), institutional investors' monitoring (Ward, Yin, and Zeng, 2020), accounting conservatism (García-Lara, Osma, and

Peñalva, 2016), director connections (Hann, Subasi, and Zheng, 2019), and analysts' coverage (Brogaard, Shi, Wei, and You, 2016).

2.1.2. Measures of Bad Times

We focus on recessions as our definition of bad times as they are likely exogenous to firms' financial policy decisions. We follow prior studies (e.g., Loh and Stulz, 2018) and define recession years as any year with at least three months that are in an NBER defined recession. The post-1972 recession periods (when our data begins) are December 1973 to March 1975, January 1980 to July 1980, July 1981 to November 1982, June 1990 to March 1991, March 2001 to December 2001, and December 2007 to June 2009.[4] As a robustness check, in Section 6 we change the three-month threshold to one, two, or six months.

2.1.3. Other Variables

We include a few additional firm-level variables used in our analysis. *Total Assets (Adjusted)* are the total book assets, adjusted to 2010 dollars. *Tangibility* is the ratio of net PP&E to total assets. *Market-to-Book* is defined as total book assets plus the market value of common equity minus the book value of common equity and deferred taxes, all divided by total book assets. *Cash Flow* is net income plus depreciation and amortization and deferred taxes divided by total assets. *Sales Growth* is the one-year growth in sales, and *ROA* is operating income before depreciation divided by the average of current and lagged book assets.

We also include a few monitoring and governance variables. These variables include indicators for whether a firm has at least one 13D or 13G filing in a year (*13D Indicator*, *13G Indicator*), as well as the number of filings for a firm in a year. We also include entrenchment index (*E-Index*) values for firms that have them. The entrenchment index is based on six provisions in the corporate charter. Two are anti-takeover provisions (ATPs) and four are provisions designed to curb shareholder rights. The index is constructed by assigning a score of one for each provision. Therefore, the index ranges from a feasible low of zero to a high of six; a high score is associated with weak shareholder rights. For the years in which

[4]See https://www.nber.org/cycles.html for a complete list of recessionary periods.

the Institutional Shareholder Service (ISS) database does not report the scores, we follow Bebchuk, Cohen, and Ferrell (2009) and use the index from the latest available year.

2.2. Descriptive Statistics

Table 2 reports the summary statistics for the variables used throughout this paper. We find that the average new investment across all firm-years is 7.8% of lagged assets. The average firm in our sample has assets worth about $2.038 billion (in 2010 dollars), a leverage ratio of 33.7%, and is about 13.6 years old. Cash accounts for 16.8% of lagged assets. The abnormal investment measure can be calculated for 145,858 observations, of which 60,102 observations are in overinvesting sample and 85,756 observations are in underinvesting sample. Average abnormal investment, overinvestment, and underinvestment are 6.2%, 7.5%, and 5.3% of lagged assets, respectively. These percentages are about the same magnitude as the average new investment. About 21.1% of the observations in our sample are in bad years when we use the three-month threshold to identify bad times. Overall, we observe large cross-sectional differences in investment, our abnormal investment proxies, and firm characteristics.

Table 3 splits firms into three groups. Based on the estimated investment residuals, we classify firms into three terciles. We label the firms with the largest positive residuals "Overinvestors" (the highest tercile). We classify firms with the most negative residuals "Underinvestors" (the lowest tercile). The remaining firms in the middle tercile, which have residuals closest to zero, are labeled "Normal Investors." Panel A of Table 3 provides summary statistics for each group of firms. On average, firms that fall into the normal investors classification are larger, older, and have higher annual cash flows, lower market-to-book, and lower sales growth. Over- and underinvestors are similar in terms of average size and age although overinvestors have higher average market-to-book and sales growth.

Given the investment residuals are calculated each year, a question is how frequently firms move between the three investor categories. We present the average transition matrix for firms over the sample in Panel B of Table 3. On average, firms are most likely to remain in the same category as the prior year, with the likelihood of remaining an over- or underinvestor

being about 42% and remaining a normal investor being about 47%. Interestingly, the average overinvestor is more likely to switch to being an underinvestor in the next year (33.50%) than to become a normal investor (24.42%). This may be because of the lumpiness of some types of investment.

3. Main Results: Bad Times and Abnormal Investment

In this section, we test the hypothesis that firms move toward their expected investment levels in recessions. Using our measure of abnormal investment, we present both simple univariate results and multivariate regression tests. In Section 4, we explore different economic mechanisms that might be behind the relationship.

3.1. Univariate Analysis

We begin by showing the association between bad times and abnormal investment graphically. Using the tercile classifications, Figure 1 plots the level of overinvestment for the median overinvestor around each of the recession periods in our sample. Figure 2 similarly plots the level of underinvestment for the median underinvestor around each recession period. Since the gap between the recessions from January 1980 to July 1980 and from July 1981 to November 1982 is minimal, we graphically treat them as a single recession. The shaded gray bars mark recessions between 1972 and 2017, as dated by NBER. Each figure also shows the median overinvestment or underinvestment averaged across all the recession periods (the bottom-right plots). Across almost all the economic downturns, overinvestment decreases during the recession and the year after. Underinvesting firms increase their investment relative to their predicted level in the year following most downturns. In other words, both overinvesting and underinvesting firms move closer to the expected investment level. These effects tend to reverse two years after each recession, suggesting that average abnormal investment increases during good times.

Figures 1 and 2 show that abnormal investment—as captured by larger residuals—is reduced in recessions. Since these measures are regression residuals, they do not speak directly to the level of investment. Also, the result could be driven partly by compositional changes

in the sample of firms. To get a fuller picture, Figures 3 and 4 combine all the recessionary periods and presents them in event time. Compared to Figures 1 and 2, which reclassify firms each year, here groups are classified in the year before the recession ($t = -1$) and followed over the subsequent years. For recessions that span multiple years, each recession year is considered $t = 0$.

We find that the gap between the normal and abnormal investing groups shrinks as the economy falls into a contraction phase. This is true if considering the investment residuals (Figure 3) or the investment level directly (Figure 4). The gap continues to tighten in the year after a recession. The change in investment residuals comes from changing investment behavior for both over- and underinvesting firms. On average, overinvestors decrease their investment and underinvestors *increase* their investment in absolute terms, and not just compared to their expected level. The fact that similar patterns appear in both figures shows that the results are not just an artifact of changes in expected investment over the business cycle.

3.2. Multivariate Analysis

To formally test the findings in a multivariate setting, we estimate the following regression:

$$y_{i,j,t} = \beta_1 Bad\ Times_{t-1} + \beta_2 Controls_{i,j,t-1} + \theta_j + \varepsilon_{i,j,t}, \tag{5}$$

where y is the proxy for overinvestment (OI), underinvestment (UI), or abnormal investment (AI), as defined in equations (2) to (4). *Bad Times* is an indicator variable that equals one if year $t-1$ has at least three months that are in an NBER recession period (see Section 2.1.2). $Controls$ is a vector of firm characteristics. Following Stoughton, Wong, and Yi (2017), we control for Age, $Size$, $Cash$, $Tangibility$, $Leverage$, and $Market\text{-}to\text{-}Book$. These variables are likely to explain variation in investment activity as they capture differences in growth opportunities, age, scale, ability to borrow, and capital to spend. To control for unobservable heterogeneity, we also include industry fixed effects (θ_j) using the Fama-French 48 industry classification. Since our main variable of interest ($Bad\ Times$) is a time-series variable, we cluster standard errors by year in addition to by firm.

Based on our main hypothesis, we expect β_1 to be negative across the three measures

of abnormal investment. Columns 1 and 2 in Table 4 present the results for the sample of overinvesting firms. The coefficient for the *Bad Times* indicator is negative and statistically significant at the 1% level. The result in Column 2 equates to roughly a 17% reduction in annual overinvestment for the average firm in our sample. In effect, following bad times the average overinvesting firm eliminates about $338 million in new investments (in 2010 dollars).[5] We also find that more growth opportunities (higher market-to-book) and more cash holdings are associated with more overinvestment. Larger firms and firms with lower leverage and fewer tangible assets are associated with less overinvestment.

In Columns 3 and 4, we focus on the firms that we classify as underinvesting, relative to their predicted level. To provide a consistent interpretation of the coefficients across Table 4, we take the absolute value of the investment residuals. So for this sample, a larger positive value indicates more underinvestment. Again, we estimate a negative and statistically significant coefficient for *Bad Times*, indicating that economic hardship mitigates underinvestment. Following bad times the average underinvesting firm reduces annual underinvestment roughly by 11% (using the estimate from Column 4). Put differently, the average underinvesting firm increases its investment by about $232 million (in 2010 dollars) relative to its behavior in years without a recent bad economic shock.[6]

In Columns 5 and 6, we test the relation between bad times and abnormal investment for the full sample of firms. Here the dependent variable AI is the absolute value of the investment residual, so the interpretation remains the same. A negative value indicates less deviation from expected investment, regardless of whether the firm underinvests or overinvests. In both columns, the coefficient on the proxy for bad times is statistically significant at the 1% level. This result, paired with the results of Columns 1 through 4, suggests that abnormal investment is reduced following bad times. This reduction is economically significant as well. In the year after a recession, the average firm makes a 14% shift towards expected investment (using the estimate from Column 6). This change equates to $276 million in 2010 dollars.[7] As both types of firms adjust, this is not necessarily a unilateral decrease in investment, but

[5]The calculation for the average firm is $0.01245/0.075(= 16.6\%) \times \$2037.965$ million $\approx \$338$ million.
[6]The calculation is $0.00603/0.053(= 11.4\%) \times \$2037.965$ million $\approx \$232$ million.
[7]The calculation is $0.00841/0.062(= 13.6\%) \times \$2037.965$ million $\approx \$276$ million.

rather a shift in investment activity from overinvesting firms to underinvesting firms.

3.3. Placebo Recessions

One potential concern with our measure of abnormal investment is that the residuals from our panel regression model may exhibit simple mean reversion. For example, some firms might underinvest one year and then revert to more typical investment for reasons unrelated to the macroeconomy or business cycle. Such a statistical behavior would present as abnormal over- or underinvestment for firms with more investment volatility. However, this concern is testable. While regression residuals may mean revert at the firm level, our hypothesis is that there are systematic differences over the business cycle.

To determine whether our results reflect spurious mean reversion, we perform a set of tests based on simulated "placebo" recessions. We take every year that is not classified as *Bad Times* and calculate median over- and underinvestment for the two-year window around this date. We repeat this exercise for every year to create 32 placebo recessions. We then average these placebo recessions and plot the average sample overinvestment and underinvestment in event time. If our results were driven by general mean reversion in our abnormal investment measure, we would expect to see similar patterns to Figures 1 and 2. Figure 5 presents the results of our placebo recessions. We do not find evidence of mean reversion in these placebo recessions. In fact, there are no clear time-series statistical patterns around non-business cycle events. These results are inconsistent with residual mean reversion driving our main results.

3.4. Investment Constituents

The estimates in Table 4 show that firms on average reduce abnormal investment during bad times; overinvesting firms reduce their investment and underinvesting firms increase their investment, bringing it closer to expected levels. To shed more light on exactly how the composition of investment changes, we break apart investment into its major constituents: capital expenditures, R&D, acquisitions, and sale of PP&E. We then compute the average of each investment component for the years around recessions for both overinvesting and

underinvesting firms. Here we reclassify firms each year by their investment residuals rather than holding the classification fixed over the recession period.

Panel A in Figure 6 shows the mix of average investment for overinvestors. As these firms enter a recessionary period, they cut their capital expenditures, R&D, and acquisitions spending and slightly increase the sale of PP&E. The largest drop is in acquisitions. In the year before the recession, overinvesting firms spend about 4% (as a percentage of assets) on acquisitions but decrease it to 1.2% in the recession year, for a total decline of 2.8%. Acquisitions increase slightly in the first and second year after the recession period, but stays well below pre-recession levels. This decline is consistent with Bhagwat, Dam, and Harford (2016), who find increases in macro-level uncertainty decrease M&A activity. The second largest drop is in capital expenditures. Overinvesting firms invest about 10.5% in physical capital in the year before the recession but cut their spending by almost 1.9% in the recession year. Capital expenditures continue to drop one year after the recession and then stabilize. Innovation activities appear to be less affected by economic hardship. Overinvestors decrease their R&D spending from 6.5% in the year before to the recession to 5.6% in the recession year, less than a 1% decline.

Panel B of this figure focuses on the underinvesting firms. These firms *increase* their spending on all of the major components of investment going into a recessionary period. Physical capital spending increases 1.1% from the pre-recession year to the recession year. R&D activities increase by 0.3% during the recession and continue to increase over the subsequent years. Interestingly, acquisition activities also gather steam as the economy goes through bad times. Underinvesting firms spend 1.3% on acquisitions compared to 0.5% in the year prior to the recession.[8] Overall, the decomposition of investment in both Panels A and B shows that the change in investment is not homogeneous across different components as firms enter into a recessionary period. Overinvestors cut their total investment as acquisitions and capital expenditures experience the sharpest drop. Underinvestors scale up their total investment with physical capital and acquisitions enjoying the largest boost. To the best

[8]As an anecdotal example, a medical company called Natus Medical Incorporated is flagged as an underinvestor in 2007. During the 2008–2009 financial crisis, the company acquired NeuroCom International firm in 2008 in an $18 million deal to prior to expand its footprint in a different speciality.

of our knowledge, we are the first to document the increases in the different components of total investment for underinvesting firms during recessions. Having established changes in investment policy during bad times, the next section examines the potential channels for these changes.

4. Potential Mechanisms for Changes in Abnormal Investment

Investment behavior changes for both overinvesting and underinvesting firms following economic downturns. In this section, we explore the mechanism driving this result. We focus on two possible channels: shareholder monitoring and differences in corporate governance structures.

4.1. Shareholder Monitoring and Internal Corporate Governance

We first conduct a series of cross-sectional tests with an eye towards identifying the role that external monitoring plays in the link between investment policy and economic downturns. For shareholders, we argue that their monitoring activity is likely to intensify in downturns. When times are good, shareholders may find it more difficult to identify poor investment decisions. During recessions, however, the marginal value of shareholder monitoring increases since inefficient firms become easier to recognize. Increased monitoring then pushes managers to adjust their investment policy.

As an initial step, we document which factors lead to increased shareholder monitoring. Here we take a broad view of shareholder monitoring and consider the more activist-oriented 13D filings and the 13G filings associated with passive investors. We consider two measures of monitoring: a simple indicator that there has been some new 13D or 13G filing activity for a firm in a given year, and a log measure of the number of filings. However, as compared to the results in Table 4, we only have filing data for 1995 through 2017. We present our results in Table 5. We observe that the more active 13D filings are associated with more levered and smaller firms. In contrast, 13G filings are associated with larger and more cash-rich firms.

Common to both types of filings is a strong negative relation between past profitability and future monitoring. For example, a firm with a one standard deviation decrease in ROA

(0.261) is associated with a 4.5% increase in 13D filings (Column 2). A firm with the same decrease in ROA is associated with a 3.2% increase in 13G filings (Column 4). So there is a robust effect that firms with lower profitability attract more shareholder scrutiny.

While economic downturns are a driver of lower profitability, it is not clear whether outside investors bring additional scrutiny in bad times. In all specifications, we include an indicator variable equal to one if the current year contains a downturn (*Bad Times*). We find that recessions are important even controlling for changes in profitability. Specifically, being in a recession year is associated with a 3.8% increase in the likelihood that a given firm has a current 13D filing (Column 1) or a 4.8% increase in the number of filings (Column 2). We also find positive estimates for 13G filings, but they are not statistically significant. These results suggest that there are more filings by external investors that self-identify as activists.

Taken together, we find robust evidence that a decline in firm profitability leads both active and passive investors to increase stakes and presumably monitoring pressure, given the observed increase in 13D/13G filing activity. Activist investors increase monitoring even more so in bad times.

Given the increase in filing and monitoring activity, our next step is to see if these firms are more likely to adjust their investment activity. To test this, we estimate the following regression:

$$\begin{aligned} AI_{i,j,t} = {} & \beta_1 Bad\ Times_{t-1} + \beta_2 Recent\ Filing_{i,j,t-1} \\ & + \beta_3 Bad\ Times_{t-1} \times Recent\ Filing_{i,j,t-1} + \beta_4 Controls_{i,j,t-1} + \theta_j + \varepsilon_{i,j,t}, \end{aligned} \tag{6}$$

where *Recent Filing* is an indicator that takes a value of one if the firm i in industry j at time $t-1$ was the subject of a 13D or 13G filing and zero otherwise. As we find evidence of both increased 13D and 13G activity related to firm performance, we choose to include both types of filings in our main variable. The dependent variable, *AI*, is the proxy for abnormal investment, as defined in equation (2). Here we choose to focus on our general abnormal investment measure, although results are qualitatively similar for the overinvestment and underinvestment proxies. Lastly, *Controls* include the same firm characteristics used in Section 3. To the extent that shareholder monitoring mitigates abnormal investment, we

expect β_3 to be negative.

The results are reported in Table 6. The positive estimates for the *Recent Filing* coefficients imply that the firms that are subject to 13D and 13G filings generally have more abnormal investment. The coefficient on *Recent Filing* can be interpreted as the average level of abnormal investment among these firms in non-bad times. However, following bad times, as a result of more intense monitoring, these firms move toward expected investment. The amount of change for monitored firms is about 14.9% of the average abnormal investment level of firms in our sample (using the estimates from Column 2).[9] This correction is almost twice as large as for firms without a recent filing. As we only have filing data for 1995 through 2017, we cannot speak definitively to the role of shareholder monitoring across all the business cycles in our full sample. Nevertheless, these findings point to a monitoring channel in which firms with more shareholder activism react more strongly to recessions.

Another possible mechanism is the role of internal governance and the degree of managerial entrenchment. Ultimately, the responsiveness of management to changing economic conditions will be determined, in part, by their job security. If management is sufficiently entrenched that their jobs are not at risk, the disciplinary threat of increased scrutiny during an economic downturn will lack teeth. Alternatively, if the change in investment behavior is not related to this channel, we would not expect significant differences in investment behavior along this entrenchment dimension.

To test this channel, we estimate the following regression:

$$\begin{aligned} AI_{i,j,t} = {} & \beta_1 Bad\ Times_{t-1} + \beta_2 Low\ Entrenchment_{i,j,t-1} \\ & + \beta_3 Bad\ Times_{t-1} \times Low\ Entrenchment_{i,j,t-1} + \beta_4 Controls_{i,j,t-1} + \theta_j + \varepsilon_{i,j,t}, \end{aligned} \quad (7)$$

where *Low Entrenchment* is an indicator variable that is one if the entrenchment index of Bebchuk, Cohen, and Ferrell (2009) for firm i in industry j in year $t-1$ is below the median for that year and zero otherwise.[10] Thus, as defined, *Low Entrenchment* implies better governance and lower managerial entrenchment. The dependent variable and vector of control variables are similar to the model presented in equation (6). We expect β_3 to be

[9] The calculation is $(0.00490 + 0.00436)/0.062 = 14.9\%$.

[10] The entrenchment index is described in more detail in Section 2.1.3.

negative and similar to our 13D/G filing data, we use entrenchment data from 1995 through 2017.

Columns 3 and 4 in Table 6 report the results of this exercise. We still find that the *Bad Times* indicator reduces abnormal investment for the high-entrenchment firms ($\beta_1 < 0$). However, the effect is more pronounced for low entrenchment firms. In Column 4, we document negative and significant coefficient estimate on the interaction term (β_3). This effect is despite the fact that firms with low entrenchment do not have higher abnormal investment than other firms during non-bad times (β_2). Similar to the shareholder activism results, this implies that firms with less entrenchment and better corporate governance react more aggressively to recessions and change their investment policy more sharply.

4.2. Reformers

The evidence presented in Section 4.1 points to shareholder monitoring and internal governance as important channels driving changes in investment policy. To shed further light on this hypothesis, we categorize firms by whether they "reform" their investment behavior, in the sense that their subsequent activity moves closer to expected levels. Similar to Figures 3 and 4, we split the abnormal investment residuals into three terciles. We classify the highest tercile firms (most positive residuals) as overinvestors and the lowest tercile firms (most negative residuals) as underinvestors. Firms in the middle tercile (investment residuals close to zero) are considered normal investors. We consider the categorization of firms in the year before a recession and then form conditional sub-groups based on whether abnormal firms become normal investors. We define the firms that become normal investors as *Reformers* and those that do not as *Non-Reformers*.

In Figure 7, we present results on monitoring separately for *Reformers* and *Non-Reformers*. For firms classified as *Reformers*, we find that 48.2% of them have a recent shareholder filing while the figure is only 42.2% for *Non-Reformers*. Similarly, 23.6% of *Reformers* have low entrenchment scores compared to only 20.1% for *Non-Reformers*. Both differences are statistically significant. While the economic magnitudes are modest, even our coarse splits suggest that monitoring may play an important role in the readjustment of investment policy

over the business cycle.

5. Firm Value Following Changes in Abnormal Investment

In Sections 3 and 4, our study provides evidence that deviations from expected investment are reduced during economic downturns. If overinvestors cut less productive investments and underinvestors undertake additional productive investments, the effect of these changes on firm value should be positive. Identifying this effect is difficult as the macroeconomic effects of a recession will lower the value of almost all firms, regardless of their investment policy. We, therefore, take a difference-in-differences approach. We compare firms with similar levels of abnormal investment in the year before the downturn, but different behavior afterwards according to whether they reform their investment behavior as measured by a reduction in abnormal investment. By comparing the change in the value—proxied by market-to-book ratios—of these two groups over time, we can remove differences in industry, time period, or other determinants not specific to their investment policy. We conduct our tests both separately for overinvesting and underinvesting firms and pooled together as abnormally investing firms.

In Figure 8, we focus on overinvestors (highest tercile of the abnormal investment residual). The initial classification is based on the year before a recession period ($t = -1$ in event time). Next, we reclassify firms in $t = 0$ (the recession year) based on their abnormal investment residual at that time. Figure 8 compares the change in market-to-book over time for the firms that initially overinvested but switched to normal investment (*Reformers*) against the firms that remain as overinvestors for both the pre-recession year and the recession year (*Non-Reformers*). As the normal investors (the middle tercile of firms by abnormal investment) have residuals closest to zero, we deem them closest to their expected investment levels. The difference in the average market-to-book ratio from the pre-recession year ($t = -1$) for both groups is plotted for the period $t = -1$ through $t = 2$ (two years following the recession year).

While both subsamples experience a decline in market-to-book ratios during the recession, the drop is smaller for firms that reformed their behavior by reducing abnormal overinvestment.

The difference remains for the two years following the end of a recession period and is statistically significant for $t = 0$ and $t = 1$. Overall, the negative effect of the recession on firm value is less for firms that adjust their investment policy in response.

In Figure 9, we repeat our analysis for underinvestors. The results are similar. Firms that change investment policy—moving from being underinvestors to normal investors—see smaller declines in their market-to-book ratios during the recession and the years immediately afterward. So this effect is present for both underinvestors that increase investment and overinvestors that decrease investment.

Table 7 reports more formal regression results that tell the same story as the figures. To test whether firms that reduce abnormal investment in a recession benefit from the change, we estimate the following:

$$MB_{i,j,t} = \beta_1 Reformer_{i,j} \times Post\text{-}Recession_t + \beta_2 Firm\ Controls_{i,j,t-1} + \mu_i + \lambda_t + \varepsilon_{i,j,t}, \quad (8)$$

where we focus on windows that begin one year prior to a recession year and end two years after a recession year. Here *Post-Recession* is an indicator equal to one in the two years after a recession. *Reformer* is an indicator equal to one if a firm moves from being an over- or underinvestor in $t-1$ to a normal investor in the recession year, t. To isolate the effect of changing investment behavior, we limit our sample to only those firms that either qualified as an over- or underinvestor in the pre-recession year. Finally, we include firm characteristics, firm fixed effects, and year fixed effects in our specifications. Overall, we find that reformers experience a boost in valuation ratios that is economically and statistically significant. Using the estimates from Column 2, firms that become normal investors have 4.7% higher market-to-book ratios post-recession than their non-adjusting peers, relative to their prior level. This percentage is as a fraction of the median sample market-to-book ratio.[11] While Columns 1 and 2 group overinvestors and underinvestors together, we obtain economically similar results if we consider each group separately (Columns 3 and 4). These results suggest that firms that adjust toward expected investment following recessions improve their valuation ratios relative to peers. These positive valuation changes for firms that alter

[11]The calculation is $0.063/1.342 = 4.7\%$.

their investment policy suggest that their investment is made more efficient.

6. Robustness Tests

While we consider our definition of "bad times" as reasonable, we also conduct robustness tests to determine whether our main results are sensitive to changes in our recession thresholds. In Table 8, we report results based on defining bad times as years with a minimum of one, two, or six-month recession periods and reestimate equation (5). The results are insensitive to the change of recession thresholds: overinvestment, underinvestment, and general abnormal investment all decline during recessions. The estimates are similar in economic magnitude to our main specifications in Table 4, and all estimates remain statistically significant.

Another concern may be our measure of abnormal investment based on Richardson (2006) and Stoughton et al. (2017). In Table 9, we present results based on two alternative specifications to estimate abnormal investment. Specifically, instead of using the residuals of equation (1), we use residuals from the following model:

$$I_{i,j,t} = \beta_1 \textit{Growth Opportunities Proxy}_{i,j,t-1} + \theta_j + \lambda_t + \varepsilon_{i,j,t}, \tag{9}$$

where *Growth Opportunities Proxy* is either the firm's sales growth (following Biddle, Hilary, and Verdi, 2009; García-Lara, Osma, and Peñalva, 2016) or its lagged market-to-book ratio. Sales growth is defined as the percentage change in sales from year $t-2$ to year $t-1$. Our main results hold. Economic downturns mitigate overinvestment, underinvestment, and abnormal investment in general.

Finally, in addition to macro-level recessions dated by NBER, we use industry production data released by the Bureau of Economic Analysis (BEA) and define industry-level "bad times" based on industry-level GDP growth. Specifically, each year we classify an *Industry Downturn* as the industries in the bottom tercile by GDP growth.[12] In Table 10, we consider whether firms facing an industry downturn adjust their investment policy. We find that for all three measures of abnormal investment, firms experiencing a recent downturn move

[12]The industry GDP growth maps to the Fama-French 17 industry classification, although we continue to use the Fama-French 48 industry classification for our fixed effects. We get similar results if we define *Industry Downturn* as being the bottom quartile or bottom decile of industries in a given year.

toward their expected investment. In the case of overinvestment and abnormal investment, the results are statistically significant at the 5% level. The findings are consistent with the NBER macro-level recessions used elsewhere in the paper.[13] Whether a firm is facing an industry-specific or economy-wide downturn, it appears to spur changes in investment policy.

7. Conclusion

In this paper, we argue that the abnormal deviations in investment policy are reduced in recessions. While investment levels generally decline during downturns, the move appears to improve firm value. The effects we document work in both directions. Both overinvesting and underinvesting firms reduce abnormal investment by 11–17%. While the productivity of the capital stock is strongly procyclical, new investment spending appears to guide firms toward more efficient resource allocation when times are bad. These findings are consistent with the notion of Schumpter's creative destruction on the intensive margin, where business cycles serve the beneficial role of winnowing bad investments and directing capital to more economically viable projects.

Our results suggest that corporate financing frictions play an important role in the dynamic evolution of investment policy. We test a number of potential channels and find that abnormal investment is reduced more in firms with more shareholder activism and better corporate governance. These findings highlight the importance of agency conflicts, moral hazard, and information costs for the capital formation process. While there are many studies that connect corporate finance frictions to decisions on payout, mergers, compensation, and capital structure, our findings expand our understanding of how these frictions drive investment policy and how these effects evolve over the business cycle. In particular, we find that monitoring evolves endogenously and plays an especially important role in economic downturns.

Finally, we show that these changes in investment policy on average improve firm

[13]In unreported results, we find that the *Industry Downturn* coefficients remain statistically significant for overinvestment and abnormal investment when including our *Bad Times* control. These results suggest that the changes in investment policy are not limited to industry downturns that coincide with macroeconomic downturns.

value. Valuation ratios tend to converge as over- and underinvesting firms improve their capital allocation. Overall, our findings support the notion of creative destruction of less productive economic activities during economic downturns. The atomistic discipline of increased monitoring at the firm level during recessions appears to play an important role in the aggregate capital formation process.

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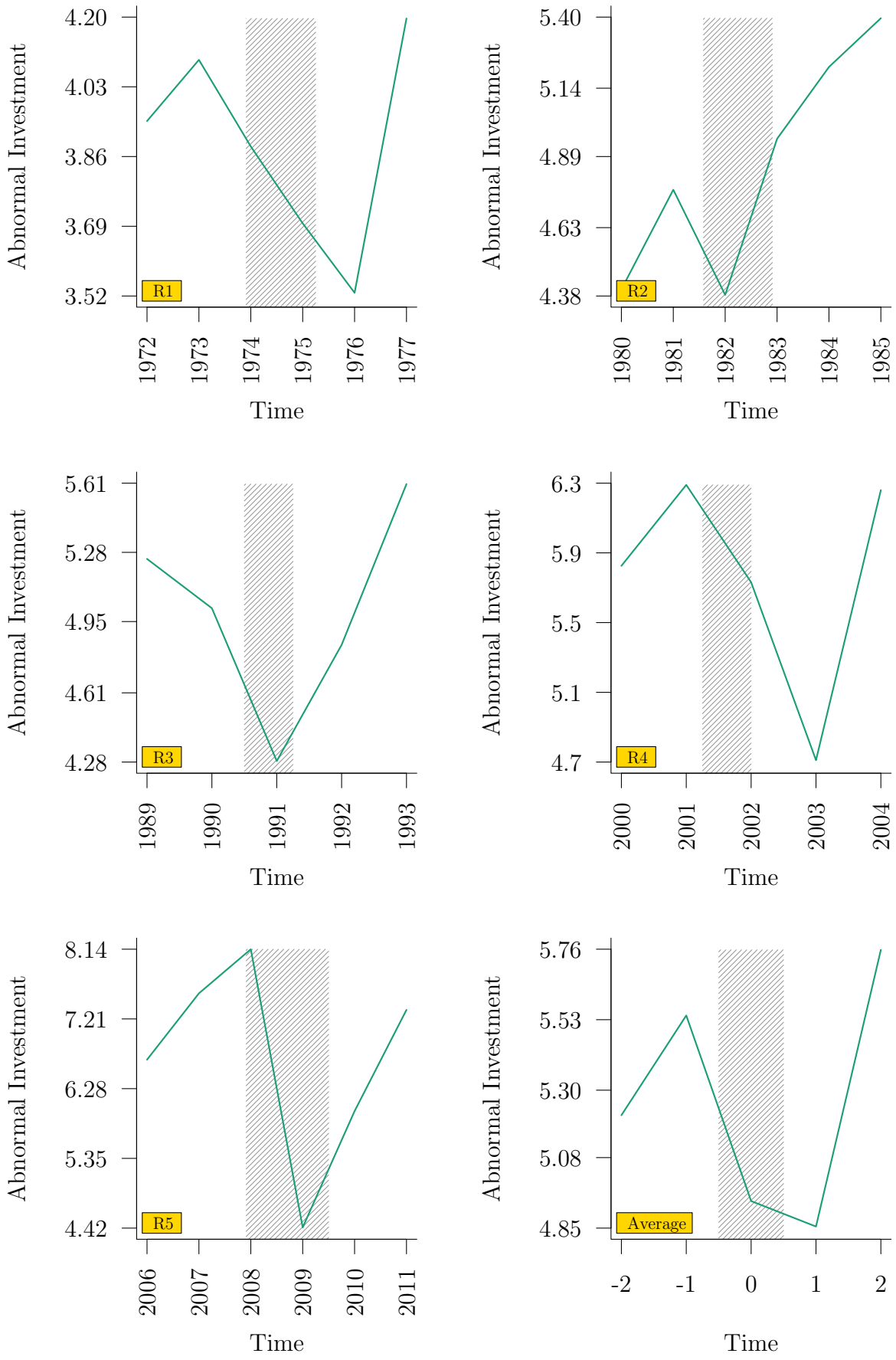

Figure 1: Abnormal Investment over Time—Overinvestors

This figure plots the median overinvestment level (abnormal investment) around each NBER recession period (shaded area) and an average across all recession periods. Firms in the highest tercile by abnormal investment residual are classified as overinvestors.

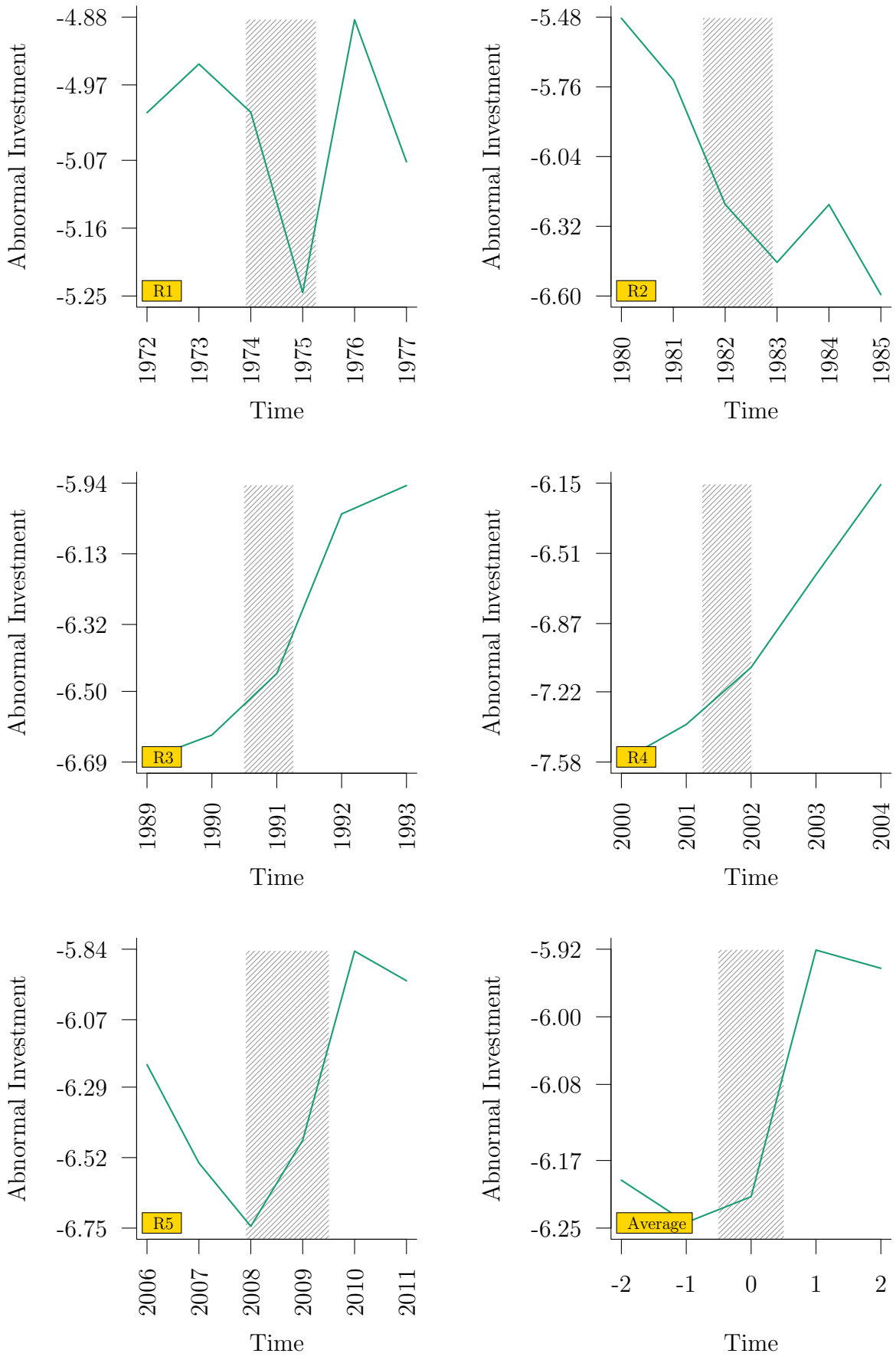

Figure 2: Abnormal Investment over Time—Underinvestors

This figure plots the median underinvestment level (abnormal investment) around each NBER recession period (shaded area) and an average across all recession periods. Firms in the lowest tercile by abnormal investment residual are classified as underinvestors.

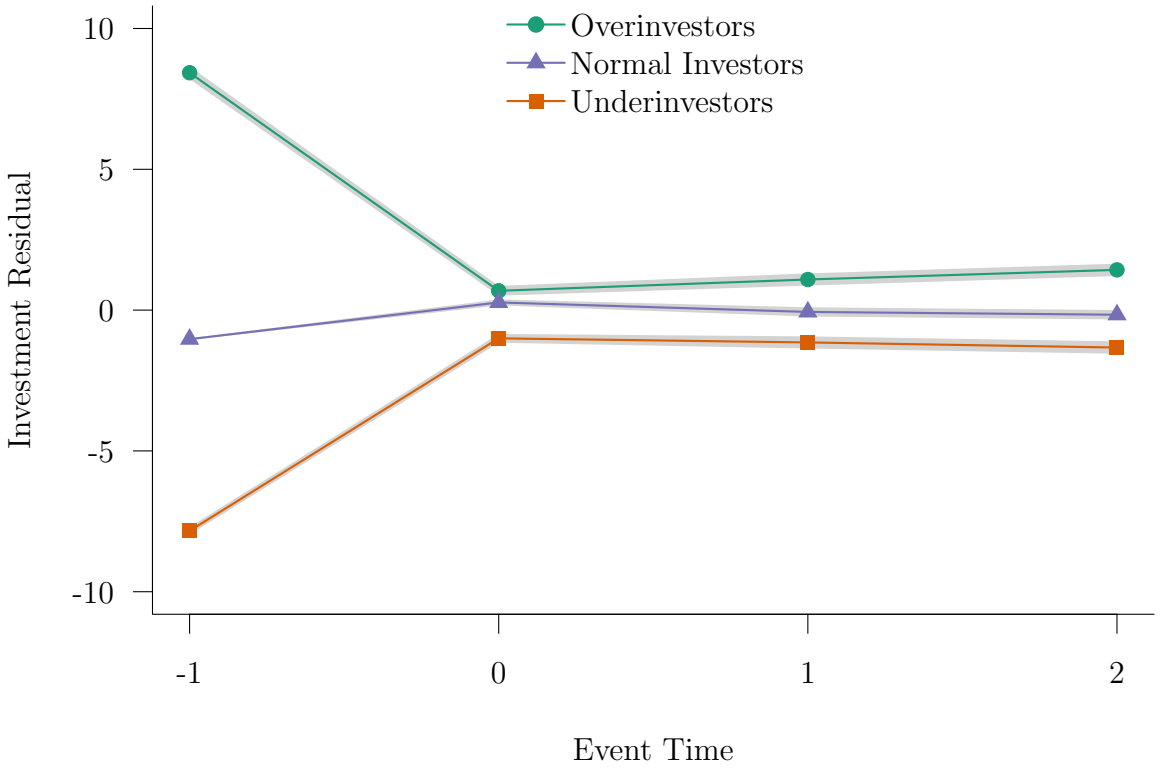

Figure 3: Abnormal Investment over Time

This figure splits firms into three groups: overinvestors (the highest tercile by abnormal investment residuals), normal investors (the middle tercile by abnormal investment residuals), and underinvestors (the lowest tercile by abnormal investment residuals). The average abnormal investment residual for each group is plotted over event time. Recession years correspond to $t = 0$ in event time. The terciles are formed at event time $t = -1$ (the year before the recession). Shaded areas correspond to the 90% confidence intervals.

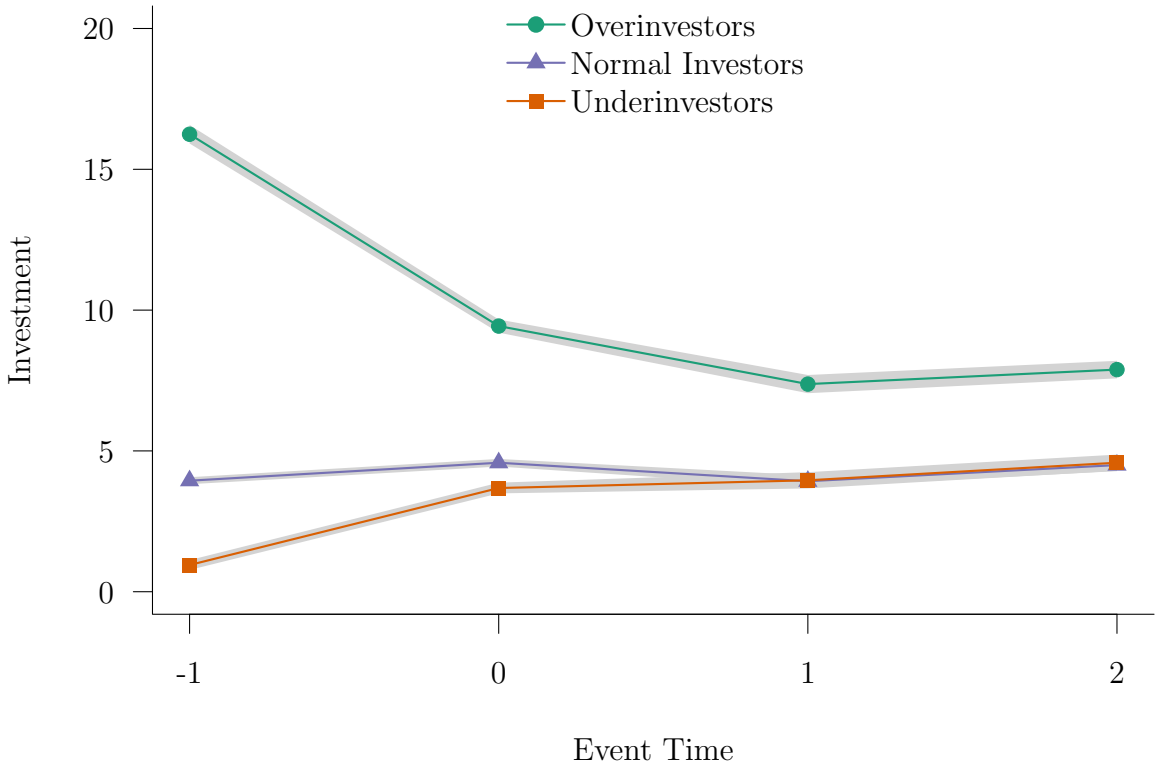

Figure 4: Change in Investment over Time

This figure splits firms into three groups: overinvestors (the highest tercile by abnormal investment residuals), normal investors (the middle tercile by abnormal investment residuals), and underinvestors (the lowest tercile by abnormal investment residuals). The average new investment for each group is plotted over event time. Recession years correspond to $t = 0$ in event time. The terciles are formed at event time $t = -1$ (the year before the recession). Shaded areas correspond to the 90% confidence intervals.

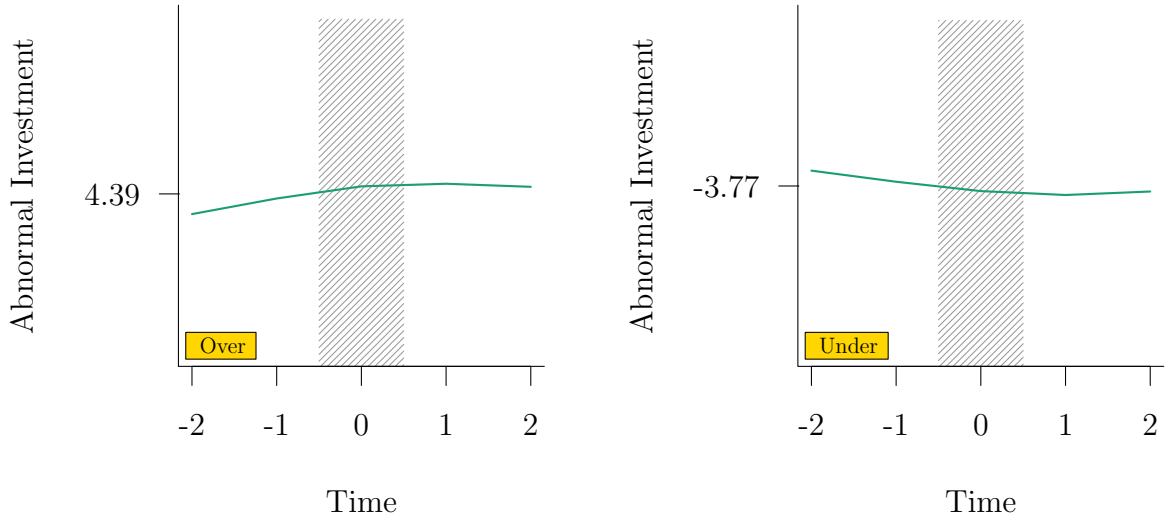

Figure 5: Simulation of Abnormal Investment over Time

This figure plots the average overinvestment (left figure) and average underinvestment level (right figure) around 32 simulated recessionary periods (shaded area).

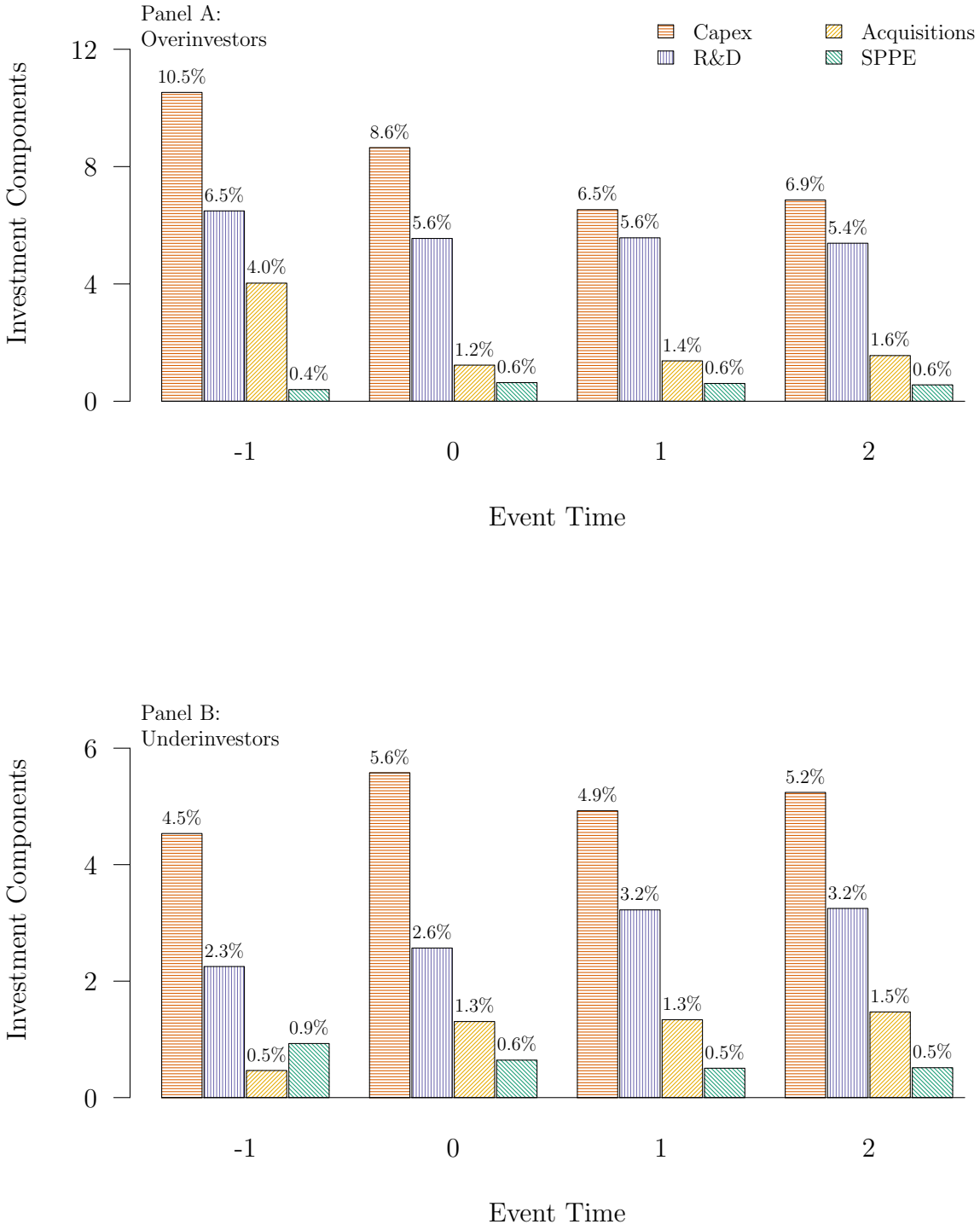

Figure 6: Investment Decomposition

This figure decomposes firms' average investment into four categories: capital expenditures (Capex); research and development expenses (R&D); acquisitions; and sales of property, plant, and equipment (SPPE). Panel A plots the mix of average investment for overinvestors (the highest tercile by abnormal investment residual), and Panel B plots the mix of average investment for underinvestors (the lowest tercile by abnormal investment residual). Recession years correspond to $t = 0$ in event time.

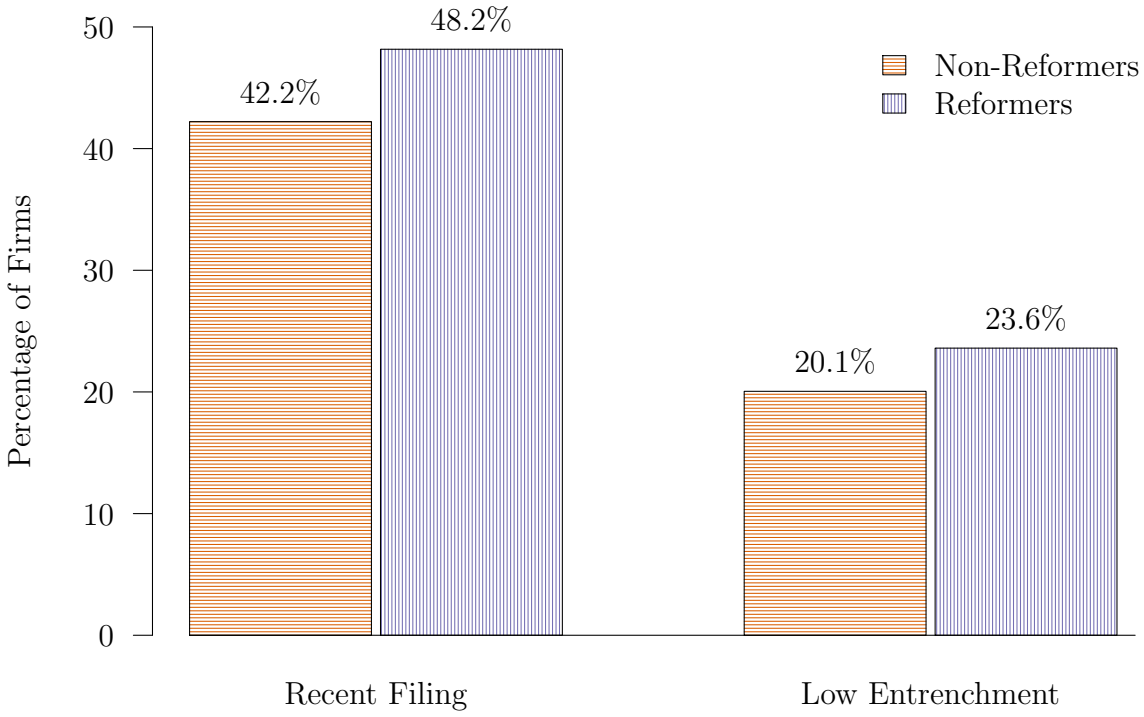

Figure 7: Reformers and Monitoring

This figure splits firms into three groups: overinvestors (the highest tercile by abnormal investment residual), normal investors (the middle tercile by abnormal investment residual), and underinvestors (the lowest tercile by abnormal investment residual). Firms are sorted into groups at event time $t = -1$ (the year before the recession) and again at event time $t = 0$ (the recession year). Focusing on firms that are classified as overinvestors or underinvestors at $t = -1$, *Reformers* are those firms that become normal investors at $t = 0$, while *Non-Reformers* remain in their original classification. This figure shows the percentage of firms with recent 13D/G filings and good corporate governance (as measured by low entrenchment) for both *Reformers* and *Non-Reformers*.

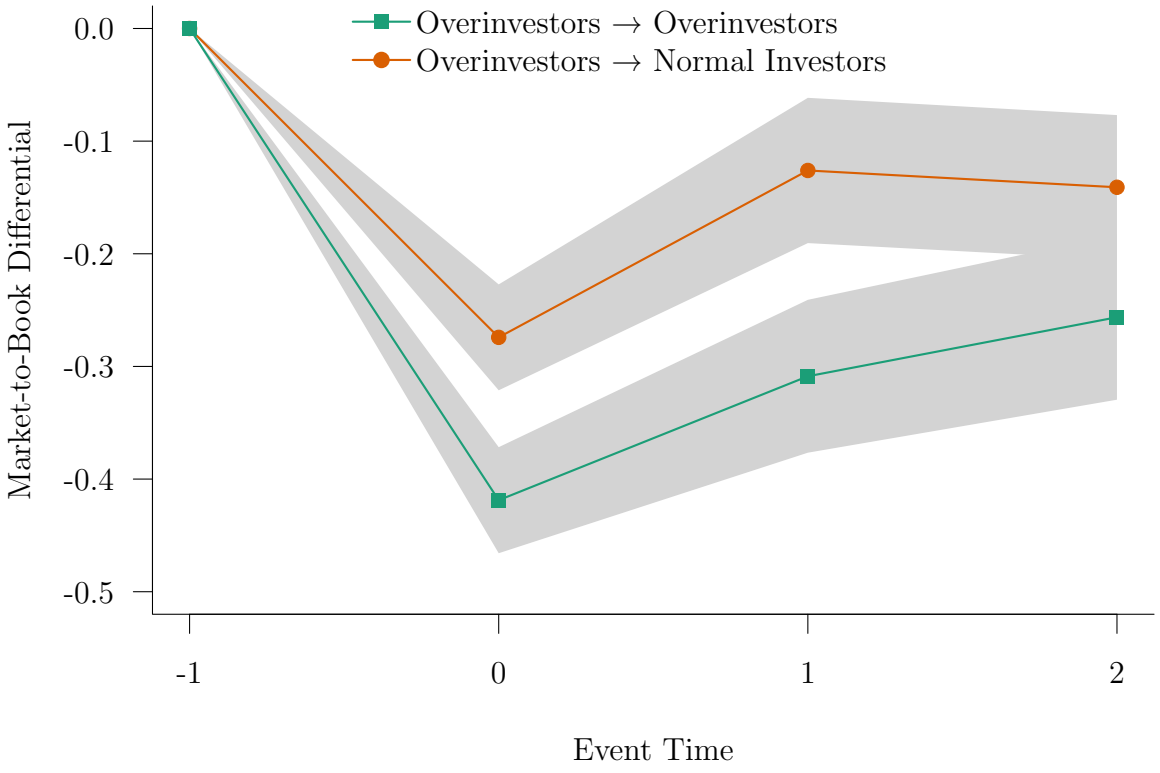

Figure 8: Changes in Value for Overinvestors

This figure splits firms into three groups: overinvestors (the highest tercile by abnormal investment residual), normal investors (the middle tercile by abnormal investment residual), and underinvestors (the lowest tercile by abnormal investment residual). Firms are sorted into groups at event time $t = -1$ (the year before the recession) and again at event time $t = 0$ (the recession year). The figure plots the average market-to-book ratio differential, defined as the difference between the current average market-to-book ratio and the market-to-book ratio at event time $t = -1$ for each group. The two groups compared are those firms that are classified as overinvestors at both $t = -1$ and $t = 0$ (*Overinvestors* $\rightarrow$ *Overinvestors*) and those groups that are classified as overinvestors at $t = -1$ but normal investors at $t = 0$ (*Overinvestors* $\rightarrow$ *Normal Investors*). Shaded areas correspond to the 90% confidence intervals.

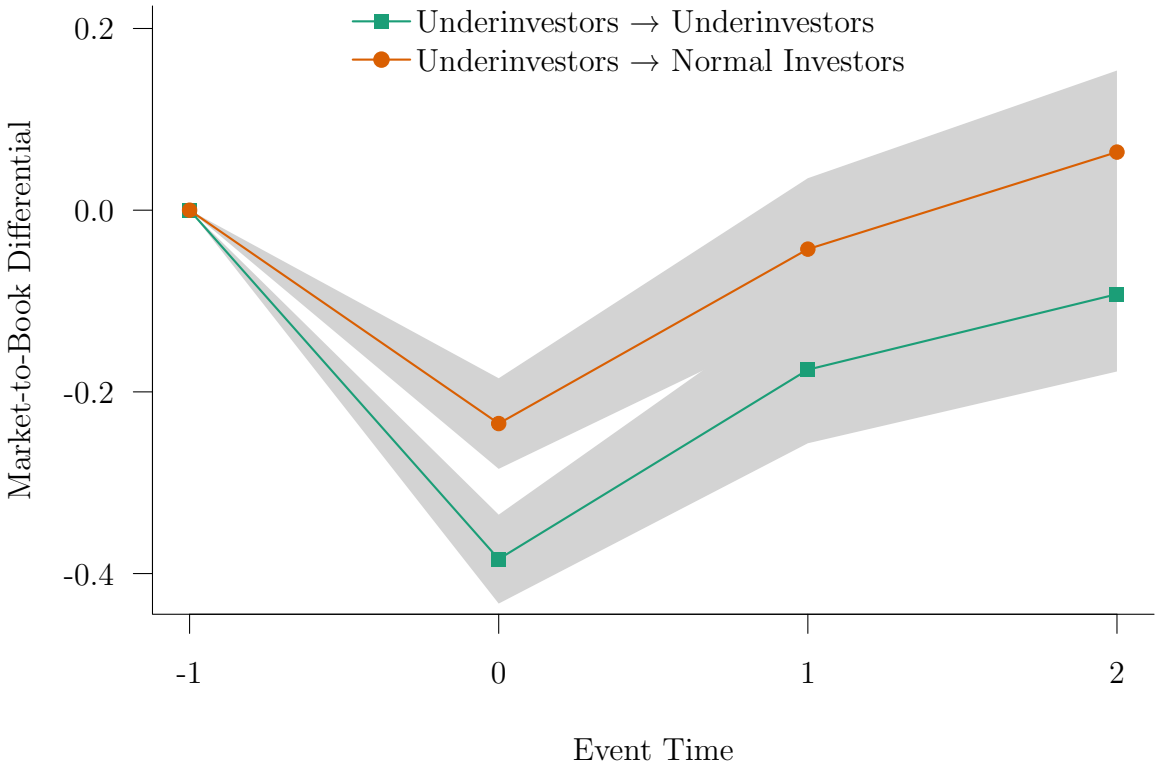

Figure 9: Changes in Value for Underinvestors

This figure splits firms into three groups: overinvestors (the highest tercile by abnormal investment residual), normal investors (the middle tercile by abnormal investment residual), and underinvestors (the lowest tercile by abnormal investment residual). Firms are sorted into groups at event time $t = -1$ (the year before the recession) and again at event time $t = 0$ (the recession year). The figure plots the average market-to-book ratio differential, defined as the difference between the current average market-to-book ratio and the market-to-book ratio at event time $t = -1$ for each group. The two groups compared are those firms that are classified as underinvestors at both $t = -1$ and $t = 0$ (*Underinvestors* $\rightarrow$ *Underinvestors*) and those groups that are classified as underinvestors at $t = -1$ but normal investors at $t = 0$ (*Underinvestors* $\rightarrow$ *Normal Investors*). Shaded areas correspond to the 90% confidence intervals.

Table 1: Predicted Investment Regression

This table reports the results of regressions of corporate new investment on a set of control variables. The sample includes U.S. firms listed on NYSE, AMEX, or NASDAQ with CRSP share codes of 10 and 11, which are covered by CRSP and Compustat between 1972 and 2017. Utilities, financials, and firms for which total assets are either missing or negative are excluded. *New Investment* is scaled by 100. All control variables are lagged and all the ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	New Investment			
	(1)	(2)	(3)	(4)
V/P	-0.681^{***}	-0.903^{***}	-0.612^{***}	-0.810^{***}
	(0.093)	(0.070)	(0.091)	(0.063)
Leverage	-2.269^{***}	-2.281^{***}	-2.315^{***}	-2.288^{***}
	(0.208)	(0.198)	(0.182)	(0.177)
Cash	14.822^{***}	15.334^{***}	12.870^{***}	13.372^{***}
	(0.679)	(0.656)	(0.530)	(0.512)
Age	0.029	0.066	-0.205^{**}	-0.161^{**}
	(0.093)	(0.087)	(0.087)	(0.079)
Size	0.050	0.103^{***}	0.112^{***}	0.176^{***}
	(0.040)	(0.036)	(0.041)	(0.036)
Return	0.948^{***}	0.900^{***}	0.942^{***}	0.894^{***}
	(0.103)	(0.088)	(0.101)	(0.083)
Prior Investment	0.497^{***}	0.495^{***}	0.460^{***}	0.457^{***}
	(0.010)	(0.010)	(0.009)	(0.009)
Industry Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	Yes	No	Yes
Adjusted R^2	0.434	0.438	0.451	0.456
Observations	145,859	145,859	140,764	140,764

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 2: Summary Statistics for the Aggregate Sample

The sample includes U.S. firms listed on NYSE, AMEX, or NASDAQ with CRSP share codes of 10 and 11, that are covered by CRSP and Compustat between 1972 and 2017. Utility (SIC codes 4900–4949) and financial (SIC codes 6000–6999) firms and firms for which total assets are either missing or negative are excluded. Number of observations (N), mean, median, first quartile (Q1), third quartile (Q3), and standard deviations (Std. Dev.) are reported. All the ratios have been winsorized at the 1% and 99% of their empirical distribution. See Section 2 for detailed definitions and the construction of the variables.

	N	Mean	Median	Q1	Q3	Std. Dev.
Investment Model Variables:						
New Investment	177,631	0.078	0.042	0.000	0.119	0.135
V/P	188,041	0.692	0.561	0.267	1.007	0.912
Leverage	190,940	0.337	0.291	0.066	0.505	0.315
Cash	198,904	0.168	0.082	0.029	0.222	0.207
Age (Unlogged)	199,037	13.646	10.000	4.000	19.000	12.226
Size	199,037	4.687	4.522	3.169	6.081	2.141
Return	181,692	0.226	0.053	−0.247	0.421	0.850
Inefficiency Proxies:						
Inefficiency	145,858	0.062	0.038	0.017	0.077	0.073
Overinvestment	60,102	0.075	0.040	0.016	0.095	0.092
Underinvestment	85,756	0.053	0.036	0.018	0.069	0.054
Bad Times Proxies:						
Recession (1m)	198,732	0.258	0.000	0.000	1.000	0.438
Recession (2m)	198,732	0.233	0.000	0.000	0.000	0.422
Recession (3m)	198,732	0.211	0.000	0.000	0.000	0.408
Recession (6m)	198,732	0.165	0.000	0.000	0.000	0.371
Other Characteristics:						
Total Assets (Adjusted)	199,037	2037.965	184.257	47.529	792.702	13070.858
Market-to-Book	181,912	2.018	1.341	0.990	2.103	2.598
Cash Flow	197,535	0.028	0.093	0.022	0.147	0.255
Sales Growth	194,499	0.261	0.097	−0.018	0.253	0.953
ROA	194,655	0.071	0.122	0.040	0.190	0.261
Tangibility	198,783	0.292	0.239	0.111	0.419	0.225
Monitoring Proxies:						
13D Indicator	42,982	0.214	0.000	0.000	0.000	0.410
13G Indicator	42,982	0.685	1.000	0.000	1.000	0.465
Num. of 13D Filings	42,982	0.565	0.000	0.000	0.000	1.491
Num. of 13G Filings	42,982	2.496	2.000	0.000	4.000	2.654
E-Index	34,292	2.594	3.000	2.000	4.000	1.390

Table 3: Summary Statistics for Overinvestors, Underinvestors, and Normal Investors

This table reports summary statistics of the characteristics of overinvesting, underinvesting, and normal investing firms. Dividing the abnormal investment residuals into terciles, *Overinvestors* are those in the highest tercile of investment residuals (largest positive residuals). *Underinvestors* are those in the lowest tercile of investment residuals (most negative residuals). *Normal Investors* are those in the middle tercile (closest to expected investment). Panel A reports the number of observations, mean, and median of the firm variables for each group. Panel B reports the transition matrix for the three groups. All the ratios have been winsorized at the 1% and 99% of their empirical distribution. See Section 2 for detailed definitions and the construction of the variables.

Panel A: Summary Statistics:

	Overinvestors		Underinvestors		Normal Investors	
	Mean	Median	Mean	Median	Mean	Median
V/P	0.647	0.529	0.608	0.538	0.922	0.720
Leverage	0.355	0.322	0.308	0.223	0.357	0.326
Cash	0.151	0.064	0.211	0.129	0.115	0.060
Age (Unlogged)	15.534	12.000	14.944	11.000	18.604	15.000
Size	4.867	4.702	4.660	4.529	5.315	5.110
Return	0.296	0.097	0.169	0.000	0.216	0.072
Tangibility	0.323	0.269	0.270	0.205	0.284	0.240
Market-to-Book	2.127	1.393	1.944	1.322	1.554	1.169
Cash Flow	−0.001	0.096	0.023	0.088	0.078	0.100
Sales Growth	0.247	0.120	0.180	0.073	0.119	0.073
Observations	48,619		48,620		48,619	

Panel B: Transition Matrix:

	Current Category		
Prior Category	Overinvestors	Underinvestors	Normal Investors
Overinvestors	42.08	33.50	24.42
Underinvestors	26.75	42.65	30.60
Normal Investors	30.74	22.16	47.11

Table 4: Overinvestment, Underinvestment, and Abnormal Investment in Bad Times

This table reports the results of regressions of abnormal investment on the *Bad Times* indicator and a set of control variables. *Overinvestment* is the absolute value of the firm's deviation from its predicted investment for firms with higher than expected investment. *Underinvestment* is the absolute value of the the firm's deviation from its predicted investment for firms with lower than expected investment. *Abnormal Investment* is the absolute value of the the firm's deviation from its predicted investment for all firms. All three investment variables are scaled by 100. *Bad Times* is an indicator for the prior calendar year having a recession for at least three months. All control variables are lagged and all ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	Overinvestment		Underinvestment		Abnormal Investment	
	(1)	(2)	(3)	(4)	(5)	(6)
Bad Times (3m)	−1.547***	−1.245***	−0.571***	−0.603***	−0.935***	−0.841***
	(0.339)	(0.293)	(0.207)	(0.209)	(0.244)	(0.240)
Market-to-Book		0.375***		0.178***		0.278***
		(0.033)		(0.018)		(0.020)
Leverage		0.674***		1.557***		1.344***
		(0.179)		(0.154)		(0.136)
Cash		10.403***		5.532***		7.430***
		(0.441)		(0.320)		(0.322)
Size		−0.452***		−0.299***		−0.358***
		(0.038)		(0.023)		(0.024)
Tangibility		0.942***		2.043***		1.890***
		(0.331)		(0.313)		(0.267)
Age		−0.462***		−0.638***		−0.606***
		(0.082)		(0.070)		(0.058)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.085	0.160	0.062	0.138	0.071	0.138
Observations	56,331	56,331	79,618	79,618	135,949	135,949

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 5: Shareholder Monitoring in Bad Times

This table reports the results of regressions of shareholder filing activity (13D or 13G) on the indicator for *Bad Times* and a set of control variables. *13D Indicator* takes a value of 1 if the firm has at least one new 13D filing in the calendar year, and 0 otherwise. *Log(1+No. 13D filings)* is the log of one plus the number of new 13D filings in the calendar year. *13G Indicator* and *Log(1+No. 13G filings)* are defined analogously for 13G filings. *Bad Times* is an indicator for the current calendar year having a recession for at least three months. All other control variables are lagged and all ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	13D Indicator	Log(1+No. of 13D Filings)	13G Indicator	Log(1+No. of 13G Filings)
	(1)	(2)	(3)	(4)
Bad Times (3m)	0.038***	0.048**	0.065	0.136
	(0.014)	(0.020)	(0.048)	(0.121)
ROA	−0.142***	−0.168***	−0.052*	−0.122**
	(0.016)	(0.020)	(0.031)	(0.054)
Market-to-Book	−0.005***	−0.007***	−0.003	−0.010*
	(0.002)	(0.003)	(0.003)	(0.005)
Leverage	0.144***	0.169***	−0.134***	−0.202***
	(0.014)	(0.020)	(0.021)	(0.034)
Cash	0.001	0.007	0.149***	0.365***
	(0.024)	(0.030)	(0.029)	(0.052)
Size	−0.022***	−0.025***	0.091***	0.167***
	(0.005)	(0.006)	(0.007)	(0.008)
Tangibility	−0.075***	−0.096***	−0.086**	−0.162**
	(0.024)	(0.032)	(0.040)	(0.068)
Age	0.028**	0.038***	0.016	0.015
	(0.012)	(0.015)	(0.032)	(0.054)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.037	0.037	0.156	0.186
Observations	33,869	33,869	33,869	33,869

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 6: Investment and Monitoring

This table considers the interaction between shareholder monitoring, managerial entrenchment, and abnormal investment. *Abnormal Investment* is the absolute value of the firm's deviation from its predicted investment for all firms, scaled by 100. *Bad Times* is an indicator for the prior calendar year having a recession for at least three months. *Recent Filing* is an indicator for whether the firm was the subject of a 13D or 13G filing in the previous year. *Low Entrenchment* is an indicator for whether the firm was below median for the entrenchment index. All other control variables are lagged and all ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	Abnormal Investment			
	(1)	(2)	(3)	(4)
Bad Times (3m)	−0.862***	−0.490***	−0.897***	−0.787***
	(0.241)	(0.147)	(0.210)	(0.239)
Recent Filing	0.274***	0.311***		
	(0.083)	(0.085)		
Bad Times × Recent Filing		−0.436***		
		(0.146)		
Low Entrenchment			−0.160	−0.128
			(0.098)	(0.108)
Bad Times × Low Entrenchment				−0.231**
				(0.107)
Market-to-Book	0.219***	0.219***	0.170**	0.171**
	(0.037)	(0.037)	(0.081)	(0.081)
Leverage	1.279***	1.280***	0.487**	0.489**
	(0.222)	(0.222)	(0.216)	(0.215)
Cash	5.682***	5.682***	4.799***	4.793***
	(0.238)	(0.238)	(0.418)	(0.420)
Size	−0.434***	−0.434***	−0.435***	−0.435***
	(0.032)	(0.032)	(0.046)	(0.046)
Tangibility	1.482***	1.482***	0.345	0.347
	(0.266)	(0.266)	(0.404)	(0.404)
Age	−0.638***	−0.641***	−0.196**	−0.196**
	(0.070)	(0.070)	(0.093)	(0.092)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.108	0.108	0.074	0.074
Observations	33,289	33,289	12,590	12,590

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 7: Valuation Effects of Investment Policy Changes

This table splits firms into three groups: overinvestors (the highest tercile by abnormal investment residual), normal investors (the middle tercile by abnormal investment residual), and underinvestors (the lowest tercile by abnormal investment residual). The panel is composed of observations for the year before each recession through two years after the end of each recession. Firms are sorted into groups at event time $t = -1$ (the year before the recession) and again at event time $t = 0$ (the recession year). *Reformers* are those over- or underinvestors that switch back to being normal investors at event time $t = 0$. All control variables are lagged (except *Cash Flow*) and all ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm. See Section 2 for detailed definitions and the construction of the variables.

	Market-to-Book			
	All Firms		Overinvestors	Underinvestors
	(1)	(2)	(3)	(4)
Reformers	0.059**	0.063**	0.063*	0.068**
	(0.026)	(0.025)	(0.038)	(0.031)
Cash Flow		0.027	0.035*	0.019
		(0.020)	(0.020)	(0.043)
Leverage		−0.005	−0.040	0.048
		(0.078)	(0.101)	(0.116)
Cash		0.387**	0.201	0.409
		(0.153)	(0.181)	(0.253)
Size		−0.348***	−0.380***	−0.366***
		(0.034)	(0.050)	(0.049)
Tangibility		−0.075	−0.051	−0.291
		(0.169)	(0.307)	(0.244)
Age		−0.221***	−0.206	−0.238*
		(0.083)	(0.130)	(0.124)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.622	0.635	0.649	0.676
Observations	27,287	26,989	13,201	13,737

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 8: Overinvestment, Underinvestment, and Abnormal Investment in Bad Times—Alternative Thresholds

This table reports the results of regressions of abnormal investment on different measures of bad times and a set of control variables. *Overinvestment* is the absolute value of the firm's deviation from its predicted investment for firms with higher than expected investment. *Underinvestment* is the absolute value of the the firm's deviation from its predicted investment for firms with lower than expected investment. *Abnormal Investment* is the absolute value of the the firm's deviation from its predicted investment for all firms. All three investment variables are scaled by 100. *Bad Times* is an indicator for the prior calendar year having a recession for at least one, two, or six months. All other control variables are the same as in Table 4. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	Overinvestment			Underinvestment			Abnormal Investment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bad Times (1m)	−1.140***			−0.526**			−0.746***		
	(0.350)			(0.242)			(0.287)		
Bad Times (2m)		−1.399***			−0.712***			−0.969***	
		(0.297)			(0.211)			(0.244)	
Bad Times (6m)			−1.037***			−0.369*			−0.610**
			(0.302)			(0.201)			(0.239)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.160	0.161	0.159	0.138	0.139	0.136	0.138	0.139	0.137
Observations	56,331	56,331	56,331	79,618	79,618	79,618	135,949	135,949	135,949

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 9: Overinvestment, Underinvestment, and Abnormal Investment in Bad Times—Alternative Specifications

This table reports the results of regressions of abnormal investment on the *Bad Times* indicator and a set of control variables, using alternative models to predict abnormal investment. Here *Overinvestment*, *Underinvestment*, and *Abnormal Investment* is defined based on a model using *Sales Growth* as the growth opportunities proxy (Columns 1–3) or *Market-to-Book* as the growth opportunities proxy (Columns 4–6). All three investment variables are scaled by 100. *Bad Times* is an indicator for the prior calendar year having a recession for at least three months. All other control variables are the same as in Table 4. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	Sales Growth			Market-to-Book		
	Overinvestment	Underinvestment	Abnormal Inv.	Overinvestment	Underinvestment	Abnormal Inv.
	(1)	(2)	(3)	(4)	(5)	(6)
Bad Times (3m)	−1.121**	−1.130***	−0.993**	−1.255**	−0.986***	−1.028***
	(0.497)	(0.355)	(0.390)	(0.509)	(0.312)	(0.384)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.229	0.129	0.185	0.246	0.189	0.210
Observations	53,076	93,536	146,612	54,594	95,383	149,977

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 10: Investment and Industry GDP

This table reports the results of regressions of overinvestment, underinvestment, or abnormal investment on industry downturns. *Overinvestment* is the absolute value of the firm's deviation from its predicted investment for firms with higher than expected investment. *Underinvestment* is the absolute value of the firm's deviation from its predicted investment for firms with lower than expected investment. *Abnormal Investment* is the absolute value of the firm's deviation from its predicted investment for all firms. All three investment variables are scaled by 100. *Industry Downturn* takes a value of 1 if the firm belongs to an industry in the bottom tercile, as measured by Fama-French 17 industry-level GDP growth from the prior year. All other firms take a value of 0. All other control variables are lagged and all ratios have been winsorized at the 1% and 99% of their empirical distribution. Standard errors are clustered by firm and year. See Section 2 for detailed definitions and the construction of the variables.

	Overinvestment	Underinvestment	Abnormal Investment
	(1)	(2)	(3)
Industry Downturn	−0.340**	−0.086	−0.219**
	(0.132)	(0.085)	(0.096)
Market-to-Book	0.405***	0.174***	0.289***
	(0.037)	(0.019)	(0.024)
Leverage	0.625***	1.568***	1.333***
	(0.183)	(0.155)	(0.141)
Cash	10.525***	5.568***	7.470***
	(0.442)	(0.319)	(0.322)
Size	−0.436***	−0.292***	−0.348***
	(0.039)	(0.024)	(0.024)
Tangibility	1.002***	2.028***	1.884***
	(0.353)	(0.321)	(0.276)
Age	−0.462***	−0.648***	−0.610***
	(0.085)	(0.071)	(0.061)
Industry Fixed Effects	Yes	Yes	Yes
Adjusted R^2	0.156	0.134	0.135
Observations	55,623	78,646	134,269

Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01